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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,434	09/06/2006	Qingquan Su	035924-0132	8784

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EXAMINER	
ENIN-OKUT, EDUE	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/560,434	SU, QINGQUAN	
	Examiner	Art Unit	
	Edu E. Enin-Okut	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/14/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Priority

1. Acknowledgment is made of Applicant's claim for foreign priority to Japanese Patent Application No. 2003-171942, filed on June 17, 2003, under 35 U.S.C. 119(a)-(d). A certified copy of that application has been received.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of *50 to 150 words*. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Buswell (US 5,360,679).

Regarding claim 1, Buswell teaches a fuel cell cogeneration system (Abstract; Fig. 2), comprising:

- reforming device [fuel processing system 114] for reforming raw material fuel to generate reformate (Abstract; 6:34-35; Claim 1);
- an oxidant gas humidifying device [contact humidifier 144, selective oxidizer precooler 146] for taking in recovered water recovered from the reformate and oxidant gas, humidifying the oxidant gas with the recovered water, and discharging the oxidant gas (Abstract; 7:19-30, 11:19-58; Claims 1, 4, 5);
- a fuel cell [fuel cell stack 186] for generating electricity through an electrochemical reaction between the generated reformate and the discharged oxidant gas, where anode off gas and cathode off gas are generated from the generated reformate and the discharged oxidant gas, respectively (Abstract; 3:3-6, 3:22-3:36, 4:3-6, 9:33-35; Claims 1, 7); and
- a hot water storage device [water tank 192, coolant accumulator 198] for storing recovered heat recovered from cooling water used to cool the fuel cell and discharged from the fuel cell (11:19-12:5; Claims 1, 8);
- wherein the reforming device takes in and combusts the anode off gas to generate combusted exhaust gas (4:59-63; Claim 1), and
- wherein there is further provided a control device [controller subsystem 212 comprising controller 214] (12:58-65).

Buswell also teaches the use of heated gas composed of at least either the combusted exhaust gas or the cathode off gas as a heat source for the oxidant gas humidifying device (5:8-13, 5:56-63, 4:3-14, 6:51-7:30; Claims 1, 3); and, use the discharged cooling water as a heat source for the oxidant gas

humidifying device (5:44-48, 7:19-23, 11:54-58). The temperature of the humidification process can be controlled to produce reactant streams having the humidification level most desirable for a given set of operating conditions (3:67-4:2).

However, Buswell does not expressly teach that the control device performs control of the heat source of oxidant humidifying device based upon a predetermined temperature.

However, one of ordinary skill in the art at the time of the invention have found it obvious to control the heat source of the oxidant humidifying device of Buswell using a predetermined temperature in order to control the temperature of the humidification process to produce reactant streams having the humidification level most desirable for a given set of operating conditions, as taught by Buswell.

6. Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buswell as applied to claim 1 above, further in view of Chen et al. (US 5,985,474).

Regarding claim 2, Buswell does not expressly disclose a heat exchanging device into which the recovered water is introduced; or, that the heated gas is directly introduced into the heat exchanging device to heat the recovered water.

Chen teaches an integrated system that includes a fuel cell assembly and reformer that supplies a reformate fuel to the cell assembly (Abstract). A hot water tank is used to supply coolant or a humidified reactant gas, e.g. air, to the fuel cell assembly (9:29-35; Fig. 7). Cold dry air may be introduced and bubbled through the hot water stored in hot water tank to produce a humidified and heated supply of air to the cathode side of fuel cell assembly (9:31-35). A heat exchanger or coil 312 can be used to heat or supplement the heating of water in the hot tank (9:13-18). Excess reformate exhaust from the fuel cell assembly may be burned to heat water in the hot water tank (9:19-23).

One of ordinary skill in the art would readily appreciate that the hot water tank of Chen as discussed above is behaving as a "heat exchanging device" when humidifying the cold, dry air.

Therefore, one of ordinary skill in the art at the time of the invention would have found it obvious to replace the hot water tank of Buswell with the tank of Chen to improve the speed and efficiency of humidification done by the oxidant humidifying device of Buswell by conditioning the air, as taught Chen, prior to introduction into the humidifying device.

As to the heated gas being used as a heat source for the oxidant gas humidifying device is introduced into the heat exchanging device to heat the introduced recovered water when the temperature is lower than the predetermined value, and the discharged cooling water being introduced into the heat exchanging device to heat the introduced recovered water when the temperature is higher than the predetermined value, these limitations have been considered, and construed as a functional limitations that add no additional structure to the fuel cell cogeneration system. See MPEP 2114. However, because the fuel cell cogeneration system of Buswell, as modified Chen, is structurally similar to that instantly disclosed, it appears capable of functioning as claimed.

Regarding claim 3, Chen also teaches From that those skilled in the art that a system of mechanical relays, valves, and switches may also be operably configured to regulate the operation of it integrated system 100 in response to the heating, hot water, and electrical power needs a load (8:19-23). In addition, it will be appreciated that instead of valves, variable speed pumps and/or blowers may also be suitable for regulation of system 100, e.g., for controlling the flow of air, fuel and reformate (8:23-27).

Buswell and Chen do not expressly teaches a heated gas flow setting device for setting a flow of the heated gas to be introduced into the heat exchanging device; or, that the control device controls the setting of the heated gas flow setting device.

However, one of ordinary skill in the art at the time of the invention would have found it obvious to use the control device of Buswell to control the flow of heat gas into the heat exchanging device of Buswell, as modified by Chen, via a heated gas flow setting device in order to respond to the electrical power needs an external load, as taught by Chen.

As to the heated gas flow setting device for setting a flow *when the temperature is lower than the predetermined value and for setting the flow of the heated gas not to be introduced into the heat exchanging device when the temperature is higher than the predetermined value* [emphasis added], this limitation has been considered, and construed as a functional limitation that adds no additional structure to the fuel cell cogeneration system. See MPEP 2114. However, because the fuel cell cogeneration system of Buswell, as modified Chen, is structurally similar to that instantly disclosed, it appears capable of functioning as claimed.

Regarding claims 4-5, Chen teaches a cooling water flow setting device [valve above heat exchanger 314] for setting a flow of the discharged cooling water not to be introduced into the heat exchanging device (9:24-28; Fig. 7).

As to the control device controlling the setting of the cooling water flow setting device, Chen also teaches that a system of mechanical relays, valves, and switches may also be operably configured to regulate the operation of it integrated system 100 in response to the heating, hot water, and electrical power needs a load, as discussed above. One of ordinary skill in the art at the time of the invention would have found it obvious to use the control device of Buswell to control the flow of discharged cooling water introduced into the heat exchanging device of Buswell, as modified by Chen, via a cooling water flow setting device in order to respond to the electrical power needs an external load, as taught by Chen.

As to the cooling water flow setting device for setting a flow of the discharged cooling water when not to be introduced into the heat exchanging device *when the temperature is lower than the predetermined value and for setting the flow of the discharged cooling water to be introduced into the heat exchanging device when the temperature is higher than the predetermined value* [emphasis added], this limitation has been considered, and construed as a functional limitation that adds no additional structure to the fuel cell cogeneration system. See MPEP 2114. However, because the fuel cell

cogeneration system of Buswell, as modified Chen, is structurally similar to that instantly disclosed, it appears capable of functioning as claimed.

Correspondence / Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Edu E. Enin-Okut** whose telephone number is **571-270-3075.** The examiner can normally be reached on Monday - Thursday, 7 a.m. - 3 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edu E Enin-Okut/
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795